

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	54	((dye adj set) or (ink adj set)) and (phthalocyanine or (direct adj blue adj "199")) and ((copper or cu or nickel or ni) same azo) and yellow	US-PGPUB; USPAT	OR	ON	2005/02/17 14:35
L2	1	("20050011402").PN.	US-PGPUB; USPAT	OR	OFF	2005/02/17 14:35
L3	1	((dye adj set) or (ink adj set)) and (phthalocyanine or (direct adj blue adj "199")) and ((copper or cu or nickel or ni) same azo) and yellow	DERWENT	OR	ON	2005/02/17 14:36
L4	295	106/31.48.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:36
L5	353	106/31.49.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:36
L6	187	106/31.5.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:36
L7	243	106/31.51.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:36
L8	247	106/31.52.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:36
L9	322	8/639.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:36
L10	259	8/641.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:36
L11	73	8/658.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:37
L12	322	8/661.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:37
L13	235	8/673.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:37
L14	76	8/684.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:37
L15	177	8/682.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:37
L16	441	8/685.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:37
L17	198	8/686.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:37
L18	351	8/687.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:37
L19	361	8/681.ccls.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:37
L20	33	kabalnov.in.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:39

L21	194	dupuy.in.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:38
L22	21	wang.in. and ((ink adj set) or (dye adj set))	US-PGPUB; USPAT	OR	ON	2005/02/17 14:38
L23	4	dupuy.in. and ((ink adj set) or (dye adj set))	US-PGPUB; USPAT	OR	ON	2005/02/17 14:38
L24	27	rolly.in.	US-PGPUB; USPAT	OR	ON	2005/02/17 14:39

=> d 11

L1 ANSWER 1 OF 1 REGISTRY COPYRIGHT 2005 ACS on STN
RN 12222-04-7 REGISTRY
CN C.I. Direct Blue 199 (8CI, 9CI) (CA INDEX NAME)
OTHER NAMES:
CN Basacid Blue 762
CN C.I. 74190
CN Daiwa Blue 319H
CN **Direct Blue 199**
CN Direct Lightfast Turquoise Blue GB
CN Direct Lightfastfast Turquoise Blue GB
CN Duasyn Direct Turquoise Blue FRL-SF
CN Fastusol Blue 75L
CN Intrajet Liquid Blue JE
CN Kayafect Turquoise RN
CN Levacell Fast Turquoise Blue BLN
CN Lurantín Light Turquoise Blue FBL
CN Nylomine Acid Turquoise P-B
CN Remaderm Blue HBL
CN Sirius Supra Turquoise Blue FB-LL
CN Solar Turquoise Blue FBL
CN Solophenyl Turquoise Blue BRLE
CN Solophenyl Turquoise Blue FL
CN Solophenyl Turquoise BRLE
DR 12262-76-9, 216082-59-6
MF Unspecified
CI COM, MAN
LC STN Files: CA, CAPLUS, CHEMCATS, CHEMLIST, CIN, CSCHEM, IFICDB, IFIPAT, IFIUDB, MSDS-OHS, TOXCENTER, USPAT2, USPATFULL
DT.CA Caplus document type: Journal; Patent; Report
RL.P Roles from patents: PREP (Preparation); PROC (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses)
RLD.P Roles for non-specific derivatives from patents: PREP (Preparation); PRP (Properties); USES (Uses)
RL.NP Roles from non-patents: BIOL (Biological study); OCCU (Occurrence); PREP (Preparation); PROC (Process); PRP (Properties); USES (Uses)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

455 REFERENCES IN FILE CA (1907 TO DATE)
5 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
458 REFERENCES IN FILE CAPLUS (1907 TO DATE)

=> d 12

L2 ANSWER 1 OF 1 REGISTRY COPYRIGHT 2005 ACS on STN
RN 6359-98-4 REGISTRY
CN Benzenesulfonic acid, 2,5-dichloro-4-[4,5-dihydro-3-methyl-5-oxo-4-[(4-sulphophenyl)azo]-1H-pyrazol-1-yl]-, disodium salt (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN C.I. Acid Yellow 17 (7CI)
CN C.I. Acid Yellow 17, disodium salt (8CI)
OTHER NAMES:
CN 1437 Yellow
CN Acid Leather Yellow 2GL
CN Acid Light Yellow 2G
CN **Acid Yellow 17**
CN Acidine Fast Yellow 2GD
CN Amacid Fast Light Yellow G
CN Amacid Light Yellow 2G
CN Apocid Light Yellow 2GX

CN Belacid Fast Light Yellow 2G
 CN Bucacid Light Yellow 2G
 CN C.I. 18965
 CN C.I. Food Yellow 5
 CN Calcocid Fast Yellow 2G
 CN Cetil Light Yellow 2G
 CN Diacid Light Yellow 2G
 CN Erio Fast Flavine 3G
 CN Erio Flavine 3G
 CN Erio Flavine SX
 CN Erio Yellow 2G
 CN Everacid Light Yellow GC
 CN Fast Light Yellow 2G
 CN Fast Light Yellow 5GL
 CN Fast Light Yellow 6GL
 CN Fast Light Yellow G 2X
 CN Fast Light Yellow GGXN-CF
 CN Fast Light Yellow Silk Special
 CN Fenalan Yellow G
 CN Food Yellow No. 5
 CN Hexacol Yellow 2G
 CN Hidacid Light Yellow 2G
 CN Intracid Fast Yellow 2GL
 CN Java Light Yellow 2GN
 CN Kayacyl Yellow GC
 CN Kayacyl Yellow GG
 CN Kayaku Acid Fast Yellow GG
 CN KCA Fast Light Yellow 5GL
 CN Kiton Fast Yellow 2GL
 CN Light Fast Yellow 2G
 CN Lighthouse Fast Yellow 2G
 CN Lissamine fast yellow
 CN Lissamine Fast Yellow 2G
 CN Lissamine Yellow 2G
 CN Metamine Fast Light Yellow 2GX
 CN Mitsui Acid Fast Yellow G
 CN Mitsui Acid Fast Yellow G Conc.
 CN Nankai Fast Light Yellow 2G
 CN Naphthazine Light Yellow 2G
 CN Neran Brilliant Yellow 2G

ADDITIONAL NAMES NOT AVAILABLE IN THIS FORMAT - Use FCN, FIDE, or ALL for
 DISPLAY

DR 3791-68-2

MF C16 H12 Cl2 N4 O7 S2 . 2 Na

LC STN Files: AGRICOLA, ANABSTR, AQUIRE, BIOBUSINESS, BIOSIS, CA, CAOLD,
 CAPLUS, CHEMCATS, CHEMLIST, CIN, CSCHEM, IFICDB, IFIPAT, IFIUDB, IPA,
 MSDS-OHS, NIOSHTIC, PIRA, PROMT, TOXCENTER, USPAT2, USPATFULL

Other Sources: DSL**, EINECS**, TSCA**

(**Enter CHEMLIST File for up-to-date regulatory information)

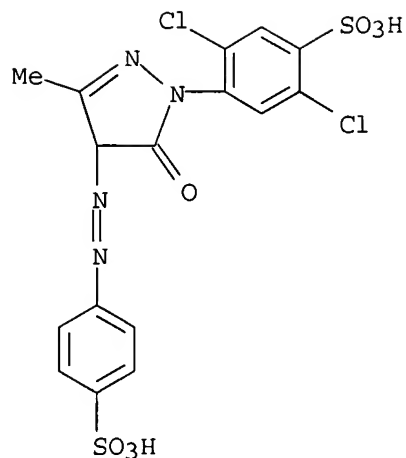
DT.CA Caplus document type: Conference; Journal; Patent

RL.P Roles from patents: ANST (Analytical study); BIOL (Biological study);
 PREP (Preparation); PROC (Process); PRP (Properties); RACT (Reactant or
 reagent); USES (Uses); NORL (No role in record)

RLD.P Roles for non-specific derivatives from patents: PREP (Preparation);
 PRP (Properties); USES (Uses)

RL.NP Roles from non-patents: ANST (Analytical study); BIOL (Biological
 study); MSC (Miscellaneous); OCCU (Occurrence); PROC (Process); PRP
 (Properties); RACT (Reactant or reagent); USES (Uses); NORL (No role in
 record)

CRN (25739-65-5)



●2 Na

215 REFERENCES IN FILE CA (1907 TO DATE)
 6 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
 216 REFERENCES IN FILE CAPLUS (1907 TO DATE)
 9 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

=> d 13

L3 ANSWER 1 OF 1 REGISTRY COPYRIGHT 2005 ACS on STN
 RN 1934-21-0 REGISTRY
 CN 1H-Pyrazole-3-carboxylic acid, 4,5-dihydro-5-oxo-1-(4-sulfophenyl)-4-[(4-sulfophenyl)azo]-, trisodium salt (9CI) (CA INDEX NAME)
 OTHER CA INDEX NAMES:
 CN C.I. Acid Yellow 23 (7CI)
 CN C.I. Acid Yellow 23, trisodium salt (8CI)
 OTHER NAMES:
 CN 1310 Yellow
 CN 1409 Yellow
 CN 3-Carboxy-5-hydroxy-1-p-sulfophenyl-4-p-sulfophenylazopyrazole trisodium salt
 CN A.F. Yellow No.4
 CN Acid Leather Yellow T
 CN **Acid Yellow 23**
 CN Acid Yellow T
 CN Acid Yellow XX-SF
 CN Acilan Yellow GG
 CN Airedale Yellow T
 CN Aizen Tartrazine
 CN Amacid Yellow T
 CN Amacid Yellow T-EX
 CN Atul Tartrazine
 CN B 3014
 CN Basovit Yellow 133E
 CN Bucacid Tartrazine
 CN C.I. 19140
 CN C.I. Food Yellow 4
 CN C.I. Solvent Yellow 57
 CN Calcocid Yellow MCG
 CN Calcocid Yellow XX
 CN Canacert Tartrazine

CN Certicol Tartrazol Yellow S
 CN Cilefa Yellow T
 CN Cogilor Yellow 113.11
 CN Curon Fast Yellow 5G
 CN D and C Yellow No. 5
 CN Dolkwal Tartrazine
 CN Duasyn Acid Yellow XX
 CN Duasyn Acid Yellow XX-SF
 CN Duasyn Acid Yellow XX-SF-LP 413
 CN Durkee Yellow Food Color
 CN Dye Yellow Lake
 CN E 102
 CN E 102 (dye)
 CN Edicol Supra Tartrazine N
 CN Egacid Yellow T
 CN Egg Yellow A
 CN Erio Tartrazine
 CN Erio Yellow T Supra
 CN Eurocert Tartrazine
 CN FD and C Yellow No. 5
 CN FD&C Yellow 5
 CN FD&C Yellow No. 5
 CN Fenazo Yellow T
 CN Food Dye Yellow 4
 CN Food dye yellow number 4

ADDITIONAL NAMES NOT AVAILABLE IN THIS FORMAT - Use FCN, FIDE, or ALL for
 DISPLAY

AR 477549-79-4

DR 12000-64-5, 642-62-6, 1342-47-8, 1342-53-6, 134240-82-7, 50809-64-8,
 139601-06-2, 154881-98-8, 84842-94-4, 117209-34-4, 183808-13-1,
 191807-79-1, 389057-90-3, 469888-21-9

MF C16 H12 N4 O9 S2 . 3 Na

CI COM

LC STN Files: ADISNEWS, AGRICOLA, ANABSTR, AQUIRE, BEILSTEIN*, BIOBUSINESS,
 BIOSIS, BIOTECHNO, CA, CABA, CANCERLIT, CAOLD, CAPLUS, CASREACT, CBNB,
 CEN, CHEMCATS, CHEMLIST, CIN, CSCHEM, CSNB, DDFU, DRUGU, EMBASE, HSDB*,
 IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, MRCK*, MSDS-OHS, NIOSHTIC, PIRA,
 PROMT, RTECS*, SPECINFO, TOXCENTER, USPAT2, USPATFULL
 (*File contains numerically searchable property data)

Other Sources: DSL**, EINECS**, TSCA**

(**Enter CHEMLIST File for up-to-date regulatory information)

DT.CA CAPLUS document type: Conference; Dissertation; Journal; Patent; Report

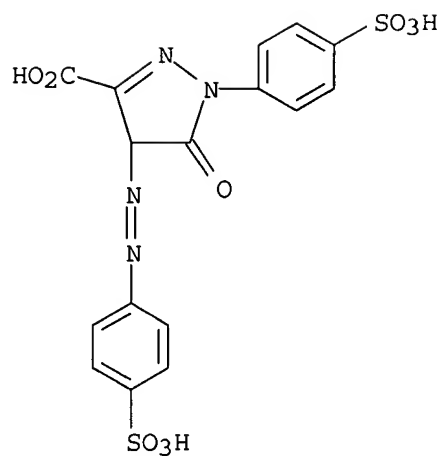
RL.P Roles from patents: ANST (Analytical study); BIOL (Biological study);
 MSC (Miscellaneous); OCCU (Occurrence); PREP (Preparation); PROC
 (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses);
 NORL (No role in record)

RLD.P Roles for non-specific derivatives from patents: BIOL (Biological
 study); PREP (Preparation); PRP (Properties); RACT (Reactant or
 reagent); USES (Uses)

RL.NP Roles from non-patents: ANST (Analytical study); BIOL (Biological
 study); MSC (Miscellaneous); OCCU (Occurrence); PREP (Preparation); PROC
 (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses);
 NORL (No role in record)

RLD.NP Roles for non-specific derivatives from non-patents: ANST (Analytical
 study); BIOL (Biological study); FORM (Formation, nonpreparative); OCCU
 (Occurrence); PREP (Preparation); PROC (Process); PRP (Properties); RACT
 (Reactant or reagent); USES (Uses)

CRN (34175-08-1)



● 3 Na

2112 REFERENCES IN FILE CA (1907 TO DATE)
 51 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
 2116 REFERENCES IN FILE CAPLUS (1907 TO DATE)
 51 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

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(FILE 'HOME' ENTERED AT 10:55:13 ON 17 FEB 2005)

FILE 'REGISTRY' ENTERED AT 10:55:22 ON 17 FEB 2005

L1	1 S DIRECT BLUE 199/CN
L2	1 S ACID YELLOW 17/CN
L3	1 S ACID YELLOW 23/CN

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A non-penetrating black ink is normally used to produce intense black text. (Bleed is not an issue with printed text since no adjacent colours are present.) Consequently, surfactants and penetrants are not normally needed in black inks; Figure 3.

The undesirable effects of colour-to-colour bleed are shown in Figure 4.

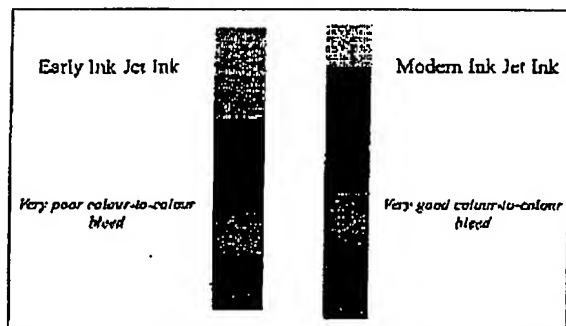


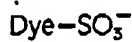
Fig. 4. Colour inks which (left) bleed and (right) don't bleed.

Ink jet colorants

What dyes and what properties are required for ink jet printers?

Japanese (Canon and SEC) and American (HP and Lexmark) companies developed ink jet printers. However, the colorant expertise needed for the inks resided largely in Europe, with companies such as BASF, Bayer and Hoechst from Germany, Sandoz and Ciba-Geigy from Switzerland, and ICI, now Avecia, from the UK. This mis-match of the 'electronics' set with the 'chemistry' set caused some initial problems. Companies such as HP, Canon and SEC had to develop their own inks using standard, commercially available dyes that were not designed for ink jet use. These first generation 'off-the-shelf' dyes were chosen from existing dyes used for various diverse applications, such as the coloration of paper, textiles and food (Gregory, 1991; Kenyon, 1996). However, they had to be purified to much higher standards to meet the more demanding criteria for ink jet printers. The high levels of purity are necessary to minimise nozzle clogging and printhead corrosion.

Anionic water-soluble dyes (1)



1

are the dyes of choice for ink jet printers. The first generation anionic water-soluble ink jet dyes had to fulfil several requirements, most importantly hue (colour), chroma (vividness), operability (reliability) and safety. High thermal stability is an additional requirement of dyes for thermal ink jets, since, as mentioned earlier, the localised ink temperatures can reach -350°C .

Imaging systems use black plus the three subtractive primary colours yellow, magenta and cyan. These three colours are chosen because they are the highest chroma (i.e. most-vivid) colours available. This can be seen from the colour map in Fig. 5; the yellow, magenta and cyan colours are the points furthest away from the centre of the colour map and chroma is the distance from the centre to a point in colour space.

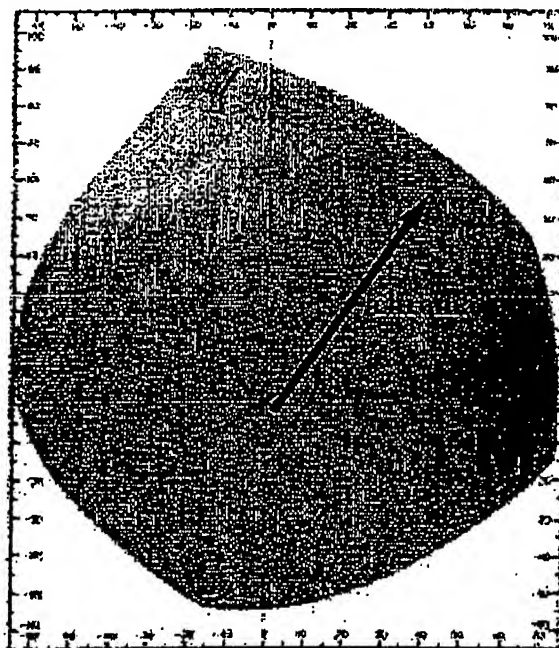
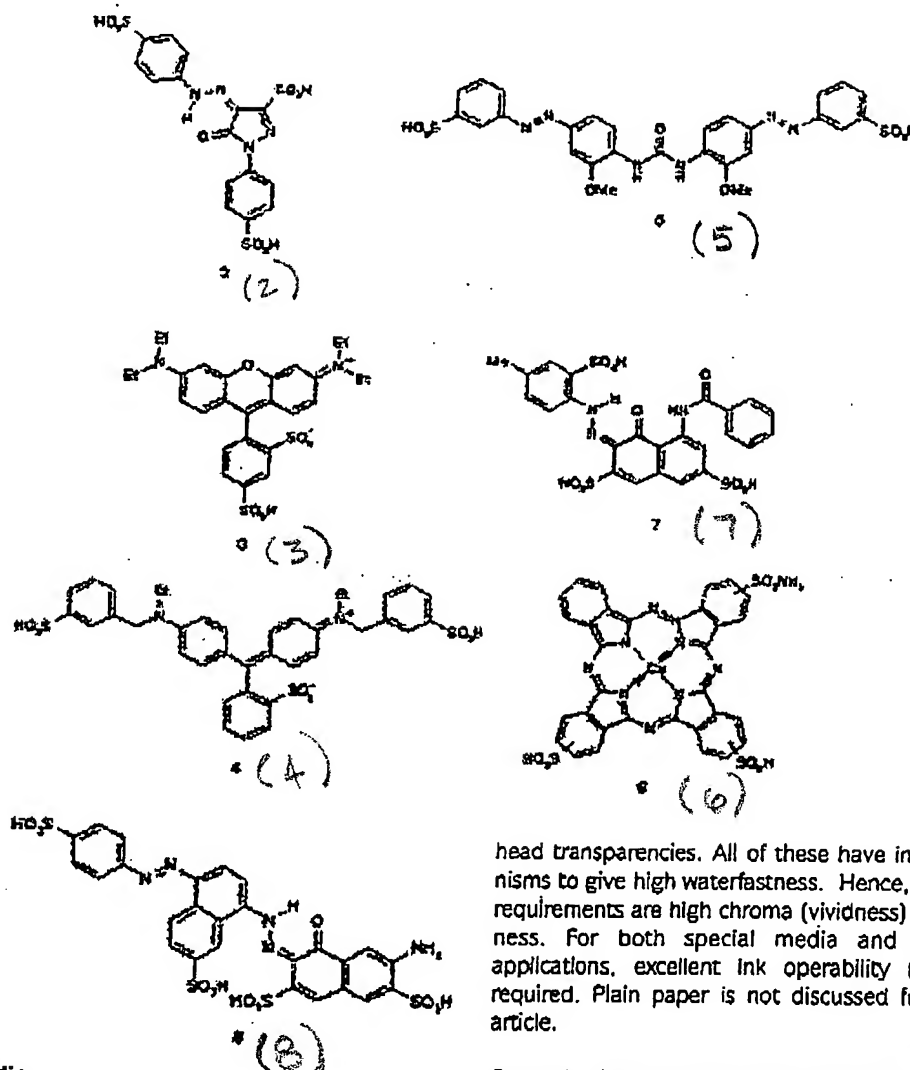


Fig. 5. Colour map showing yellow, magenta and cyan chroma.

Prints made from vivid, bright colours look much more attractive than prints made from dull colours. Hence, the first generation dyes selected had very vivid colours, such as CI Acid Yellow 23 (tartrazine), 2, used to colour orange juice, the xanthene dye CI Acid Red 52, 3 and the tri-phenylmethane dye CI Acid Blue 9, 4, two paper dyes renowned for their brilliant colour. Unfortunately, the penalty for this brilliant colour is poor light fastness, i.e. the dyes fade quickly in light. Chemists at Avecia selected dyes having superior light fastness, such as the azo dye CI Direct Yellow 132, 5 and the copper phthalocyanine dye CI Direct Blue 199, 6, whilst Mitsubishi developed the hydrazone magenta dye, 7 (Kenyon, 1996). Dyes of this type are used extensively in special media applications such as photo-realistic ink jet printing.

Because of the amount of printed text, black is the most important colour. A dye used for colouring liquorice and wine gums, CI Food Black 2, 8, was selected as the first generation black dye. It was chosen for several reasons, including its high solubility in water to give a reliable ink, and for safety, the reasoning being that if it is eaten it had to be safe!



Ink jet media

The substrates are many and varied but are conveniently divided into two basic types: (i) (plain) paper and (ii) special media. For plain paper, print quality (edge acuity), waterfastness and optical density, especially for black, are the key requirements. Special media include photographic type media for photorealistic ink jet printing, vinyl type media for wide format, and over-

head transparencies. All of these have in-built mechanisms to give high waterfastness. Hence, the main dye requirements are high chroma (vividness) and lightfastness. For both special media and plain paper applications, excellent ink operability (reliability) is required. Plain paper is not discussed further in this article.

Currently, there are two types of special media used in photorealistic ink jet printing, namely swellable polymers and microporous media. In addition to the correct colour (hue), brightness and high light fastness, rapid drytime of the ink and a gloss finish are also important. Microporous media are presently the photorealistic media of choice, primarily because of their rapid drytimes. Table 1 shows the types and properties of swellable polymer and microporous media.

Glossy for Photorealistic

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Swellable Polymer</p> <ul style="list-style-type: none"> • Based on PVOH or gelatin (Very good water absorbency) • Top layer is 20-40 μm • Dye resides in top 2-3 μm • Slow drying but good LF • Problems with pigments (Sit on surface - gloss contrast) | <p>Microporous</p> <ul style="list-style-type: none"> • Both silica and alumina types • Pore size ~ 5 μm (often unsuitable for pigments) • Dye distributes throughout microporous layer (20-40 μm) • Fast drying but lower LF than swellable polymers |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 1. Swellable polymer and microporous media.

1

L1 ANSWER 1 OF 1 REGISTRY COPYRIGHT 2005 ACS on STN

RN 12769-07-2 REGISTRY

CN C.I. Reactive Red 23 (9CI) (CA INDEX NAME)

OTHER CA INDEX NAMES:

CN 2,7-Naphthalenedisulfonic acid, 3-hydroxy-4-[[2-hydroxy-5-[[2-(sulfooxy)ethyl]sulfonyl]phenyl]azo]-, copper complex (9CI)

CN Copper, 3-hydroxy-4-[[2-hydroxy-5-[[2-(sulfooxy)ethyl]sulfonyl]phenyl]azo]-2,7-naphthalenedisulfonic acid complex (9CI)

OTHER NAMES:

CN C.I. 16202

CN Diamira Red 3B

CN Duasyn Red 3B-SF

CN **Reactive Red 23**

CN Remazol Red 3B

CN Sumifix Red 3B

DR 221006-83-3

MF Unspecified

CI COM, MAN

LC STN Files: CA, CAPLUS, CHEMLIST, PROMT, TOXCENTER, USPAT2, USPATFULL

DT.CA Caplus document type: Journal; Patent

RL.P Roles from patents: PRP (Properties); RACT (Reactant or reagent); USES (Uses)

RLD.P Roles for non-specific derivatives from patents: PREP (Preparation); USES (Uses)

RL.NP Roles from non-patents: ANST (Analytical study); BIOL (Biological study); OCCU (Occurrence); PREP (Preparation); PROC (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses); NORL (No role in record)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

52 REFERENCES IN FILE CA (1907 TO DATE)

2 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA

52 REFERENCES IN FILE CAPLUS (1907 TO DATE)

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